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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/673,783	09/29/2003	Wenjie Li	FIS920010216US2	2484

7590 05/17/2004

International Business Machines Corporation
2070 Route 52
Hopewell Junction, NY 12533

EXAMINER

GILLIAM, BARBARA LEE

ART UNIT	PAPER NUMBER
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1752

DATE MAILED: 05/17/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/673,783

Applicant(s)

LI ET AL.

Examiner

Barbara Gilliam

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 29 September 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 17-23 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☐ Claim(s) _____ is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Priority

1. The specification has been amended to include the statement reading "This application is a divisional of US Patent Application No. 09/886,428, filed June 21, 2001." as the first sentence of the specification. Applicant is reminded that the current status of all nonprovisional parent applications referenced should be included. The parent application issued as patent number, US 6,635,401 B2.

Claims

2. Claims 17-23 are pending.
3. Claims 1-16 were canceled in the amendment filed September 9, 2003.

Claim Rejections - 35 USC § 102

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. Claims 17, 21-23 are rejected under 35 U.S.C. 102(e) as being anticipated by Dammel et al. (US 2002/0187419 A1).
 - a. Dammel et al. teach a photoresist composition sensitive in the deep ultraviolet region and method of processing the photoresist (abstract). The photoresist

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composition comprises a copolymer, a photoactive component, and a solvent, where the copolymer comprises at least one ethylenic unit of structure 1 containing at least one cyano functionality and at least one unit of structure 2 (claim 1). In structure 1, when R₁ and R₂ are hydrogen and R₃ (or R₄) is either carboxylic acid or a carboxylate, and R₄ (or R₃) is the cyano group, the copolymer comprising ethylenic unit of structure 1 meets the present limitations for the acrylic imaging polymer of claim 1. The photoresist composition of Dammel et al. comprising this copolymer and the photoactive component meets the present limitations for the resist composition of claim 17 wherein the photoactive component meets the present limitations for the radiation sensitive acid generator. The cyclic unit of structure 2, meet the respective limitations for the cyclic and alicyclic olefin monomeric units of present claim 23 when R₅-R₁₆ are hydrogen and when R₅-R₁₆ are not hydrogen. The photoresist is coated onto a substrate which may be silicon/silicon dioxide type substrates typically used in microcircuitry via solvent and treated at an elevated temperature to remove residual solvents ([0034], [0036]). The coating substrate is imagewise exposed using a radiation in the range of 100 nm to about 300 nm, subjected to a post exposure baking or heat treatment and subsequently developed using an aqueous solution of alkali metal hydroxides ([0036]). The developed photoresist can then be contacted with an etching solution or dry etched ([0036]).

b. Please note that US 2002/0187419 A1 has been allowed and will issue as US 6,737,215 B2 on May 18, 2004.

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 18-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dammel et al. (US 2002/0187419 A1) in view of Ito et al. (6,627,391 B1).

a. As pointed out in the rejection under 35 U.S.C. 102(e), Dammel et al. teach a photoresist composition comprising a copolymer, a photoactive component, and a solvent, where the copolymer comprises at least one ethylenic unit of structure 1 containing at least one cyano functionality and at least one unit of structure 2 (claim 1). The photoresist is coated onto the microcircuit substrate, baked, exposed and developed ([0034]-[0036]). The developed photoresist can then be contacted with an etching solution or dry etched ([0036]). Dammel et al. do not teach specific etching techniques nor do Dammel et al. teach etching a metal layer or an intermediate layer.

b. In US 6,627,391 B1, Ito et al. teach an acid-catalyzed positive resist composition which are imageable with 193 nm radiation and are developable to form resist structures of high resolution and high etch resistance (abstract). The pattern from the resist structure can be transferred to customary materials, which include ceramics and metals, typically by reactive ion etching (column 9, lines 10-22). Additionally Ito et al. teach etching intermediate layers (claims 5-8). Therefore it would have been obvious to one of ordinary skill in the art to use the resist of Dammel et al. in typical processes of

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patterning microcircuitry substrates including metal and intermediate layers via customary etching techniques and expect to obtain a sharp pattern profile because of the good etch resistance of the cyano containing photoresist ([0011]).

Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Barbara Gilliam whose telephone number is 571-272-1330. The examiner can normally be reached on Monday through Thursday, 8:00 AM - 5:30 PM.

a. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Huff can be reached on 571-272-1385. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

b. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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Barbara Gilliam

Barbara Gilliam
Examiner
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bg
May 13, 2004